

What is claimed is:

1. A  $12\text{CaO} \cdot 7\text{Al}_2\text{O}_3$  compound comprising an  $\text{O}_2^-$  ion radical and/or an  $\text{O}^-$  ion radical serving as active oxygen species, said ion radical being clathrated in said compound in a concentration of  $10^{20} \text{ cm}^{-3}$  or more.
2. A method for producing a  $12\text{CaO} \cdot 7\text{Al}_2\text{O}_3$  compound comprising the steps of:  
preparing a raw material including calcium (Ca) and aluminum (Al) mixed with each other in an atomic equivalent ratio of 12 : 14; and  
reacting said raw material in a solid phase reaction at a sintering temperature ranging between  $1200^\circ\text{C}$  or more and less than  $1415^\circ\text{C}$ , under a dry oxidization atmosphere with an oxygen partial pressure of  $10^4 \text{ Pa}$  or more and a water-vapor partial pressure of  $10^2 \text{ Pa}$  or less.
3. A method as defined in claim 2, wherein said raw material includes a calcium component selected from the group consisting of calcium carbonate, calcium hydroxide and calcium oxide, and an aluminum component selected from the group consisting of aluminum oxide and aluminum hydroxide.
4. A method for releasing an active oxygen species clathrated in the  $12\text{CaO} \cdot 7\text{Al}_2\text{O}_3$  compound as defined in claim 1, characterized by subjecting said  $12\text{CaO} \cdot 7\text{Al}_2\text{O}_3$  compound to a heat treatment at a temperature of  $1200^\circ\text{C}$  or more under an atmosphere

with an oxygen partial pressure of less than  $10^4$  Pa or a water-vapor partial pressure of  $10^2$  Pa or more.

5. A method for quantitatively analyzing the  $O_2^-$  ion radical clathrated in the  $12CaO \cdot$

5  $7Al_2O_3$  compound as defined in claim 1, characterized in that said  $O_2^-$  ion radical is analyzed based on a scattering intensity arising from said  $O_2^-$  ion radical around a Raman shift of  $1128\text{ cm}^{-1}$ .

6. A method for quantitatively analyzing the  $O_2^-$  ion radical and  $O^-$  ion radical each  
10 clathrated in the  $12CaO \cdot 7Al_2O_3$  compound as defined in claim 1, characterized in that said  $O_2^-$  ion radical and said  $O^-$  ion radical are analyzed based on a first electron spin resonance absorption intensity defined by  $g_x = 2.00$ ,  $g_y = 2.01$  and  $g_z = 2.04$ , and a second electron spin resonance absorption intensity defined by  $g_x = g_y = 2.05$  and  $g_z = 2.00$ , respectively.

15 7. An oxidization catalyst comprising a  $12CaO \cdot 7Al_2O_3$  compound including an  $O_2^-$  ion radical and/or an  $O^-$  ion radical serving as active oxygen species, said ion radical being clathrated in said compound in a concentration of  $10^{20}\text{ cm}^{-3}$  or more.

20 8. An antibacterial agent comprising a  $12CaO \cdot 7Al_2O_3$  compound including an  $O_2^-$  ion radical and/or an  $O^-$  ion radical serving as active oxygen species, said ion radical being clathrated in said compound in a concentration of  $10^{20}\text{ cm}^{-3}$  or more.

9. An ion conductor comprising a  $12\text{CaO} \cdot 7\text{Al}_2\text{O}_3$  compound including an  $\text{O}_2^-$  ion radical and/or an  $\text{O}^-$  ion radical serving as active oxygen species, said ion radical being clathrated in said compound in a concentration of  $10^{20} \text{ cm}^{-3}$  or more.

5 10. An electrode material for solid-oxide fuel cells, comprising a  $12\text{CaO} \cdot 7\text{Al}_2\text{O}_3$  compound including an  $\text{O}_2^-$  ion radical and/or an  $\text{O}^-$  ion radical serving as active oxygen species, said ion radical being clathrated in said compound in a concentration of  $10^{20} \text{ cm}^{-3}$  or more.

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